

Feasibility of using fishwheels for long-term monitoring of Chinook salmon escapement on the Copper River

Abstract: The purpose of this study was to assess the feasibility of using fishwheels as both the capture-tag and recapture phases of a mark-recapture study for long-term monitoring of Chinook salmon (*Oncorhynchus tshawytscha*) escapement on the Copper River. The project was conducted by the Native Village of Eyak (NVE), and funding was provided by the U.S. Fish and Wildlife Service through the Office of Subsistence Management, and the U.S. Department of the Interior, Bureau of Indian Affairs. This report summarizes results from the second year (2002) of this three- year project. Objectives for the 2002 season were to: (1) Evaluate the efficacy of installing and operating two large aluminum fishwheels in Baird Canyon and a third fishwheel near Wood Canyon; (2) Estimate the ability of these fishwheels to capture Chinook salmon throughout the entire run; (3) Develop and evaluate escape panels that allow sockeye salmon (*O. nerka*) to escape from the fishwheel live tanks while retaining Chinook salmon; and (4) Generate a system-wide escapement estimate for Chinook salmon returning to the Copper River. In late May 2002, two live-capture fishwheels were re-assembled and installed in Baird Canyon (river km 66) on the Copper River. These fishwheels comprised the capture-tag phase of the study, and were operated for a total of 2,390 h from 21 May to 13 July 2002. Catches included 1,518 Chinook, 12,496 sockeye, 3 steelhead (*O. mykiss*), 9 Dolly Varden (*Salvelinus malma*), 26 whitefish (*Coregonus sp.*), 40 salmon smolts, 85 Pacific lamprey (*Lampetra tridentata*), 31 suckers (*Catostomus sp.*), 1 burbot (*Lota lota*), 3 Arctic grayling (*Thymallus arcticus*), and 1 beaver (*Castor canadensis*). A total of 1,205 adult Chinook salmon measuring 750 mm NF or greater were marked with either a radio (410 fish) or spaghetti tag (795 fish), of which 1,137 were available for recovery upstream.

A third fishwheel was installed in late May 2002 below Canyon Creek in Wood Canyon on the Copper River (river km 97). This fishwheel comprised the recapture phase of the study, and was operated for 1,598 h from 23 May to 1 August 2002. Catches included 676 Chinook, 3,689 sockeye, 2 steelhead, 2 Dolly Varden, 16 whitefish, 42 salmon smolts, 6 Pacific lamprey, 10 suckers, and 7 Arctic grayling. Sixteen (8 radio and 8 spaghetti tags) of the 580 Chinook salmon examined at the Canyon Creek fishwheel measuring 750 mm NF or greater had been tagged at the Baird Canyon fishwheels. Escape panels that were installed in the live tanks of each fishwheel in 2002 worked exceptionally well (74-92% of captured sockeye escaped during a two- hour test). Use of the escape panels reduced the potential for mortalities, as well as the amount of crew labor required to handle fish that were not sampled, and also allowed less frequent sampling sessions.

Estimated abundance of Chinook salmon measuring 750 mm NF or greater above Canyon Creek was 38,893, with 95% confidence intervals ranging from 24,487 to 61,002. To improve the precision of this estimate in the future, several options will be considered for increasing the number of fish in the recovery sample (and tag sample), including: (1) refining the current fishwheel sites, (2) supplementing fishwheel catches with a dip net operation, (3) operating an additional, smaller fishwheel, and (4) examining fish caught in the Chitina and Glennallen subsistence fisheries.

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